

a resilient seal disposed adjacent said retaining ring interior cylindrical surface to receive said workpiece and to support said workpiece at a peripheral edge and defining a second pressure zone between said workpiece and said polishing pad when said workpiece has been mounted to said head that is coupled for fluid communication to a second pressurized fluid;

said first and said second pressurized fluids being adjusted to achieve a predetermined polishing pressures over a front side surface of said workpiece.

10. (New) A workpiece tooling head as in Claim 9, further comprising:

a workpiece attachment stop plate attached to said retaining ring;

said workpiece attachment stop plate operative during non-polishing periods to prevent said workpiece from flexing an amount that would damage the structure of said workpiece from an applied vacuum force used to hold said workpiece to said polishing head during workpiece loading and unloading operations.

11. (New) A workpiece tooling head as in Claim 9, wherein said workpiece comprises a semiconductor wafer.

12. (New) A workpiece tooling head as in Claim 9, wherein said workpiece comprises a glass substrate.

13. (New) A workpiece polishing head for polishing or planarizing a workpiece on a polishing pad, said polishing head comprising:

a retaining ring having an interior cylindrical surface and defining an interior cylindrical pocket sized to carry said workpiece and to laterally restrain movement of said workpiece when said workpiece is moved relative to said polishing pad while being polished against said polishing pad, said retaining ring having a lower surface that is pressed against said polishing pad by a first pressurized fluid to define a first pressure zone of said retaining ring against said polishing pad during polishing of said workpiece;

a workpiece attachment plate attached to said retaining ring; and

said workpiece attachment plate having a plurality of resilient concentric annular sealing ridges extending from a surface of said plate and defining substantially independent pneumatic pressure zones when pressed against a back side surface of said workpiece, each said pneumatic pressure zone being coupled for fluid communication to a source of pressurized pneumatic fluid;

a first one of said plurality of resilient concentric annular sealing ridges being disposed adjacent said retaining ring interior cylindrical surface to receive said workpiece and to support said workpiece proximate a peripheral edge and defining a second pneumatic pressure zone, said second pneumatic pressure zone being coupled for fluid communication to a second pressurized pneumatic fluid;

a second one of said plurality of resilient concentric annular sealing ridges being disposed interior to said first annular sealing ridges and coupled for fluid communication to a third pressurized pneumatic fluid; and

said first, said second, and said third pressurized fluids being adjusted to achieve a predetermined polishing pressure profile between said polishing pad and a front side surface of said workpiece during polishing.

14. (New) A workpiece polishing head as in claim 13, wherein said workpiece attachment plate is further operative during non-polishing periods to prevent said workpiece from flexing an amount that would damage the structure of said workpiece from an applied vacuum force used to hold said workpiece to said polishing head during workpiece loading and unloading operations.

15. (New) A workpiece polishing head as in claim 13, wherein said workpiece comprises a semiconductor wafer.

16. (New) A workpiece polishing head as in claim 13, wherein said workpiece comprises a glass substrate.

17. (New) A method for processing a substrate having a front side surface and a backside surface on a processing tool, said method comprising:

defining a first annular pressure zone with a first sealing member;

defining a second pressure zone radially interior to said first zone with a second sealing member;

developing first and second pressures respectively in said first and said second pressure zones;

contacting said backside surface of said substrate with said first and second sealing members without an intervening structure so that said front side surface of said substrate is pressed against said processing tool according to said defined first and second pressures; and

adjusting said first and second pressures to achieve a desired substrate material remove characteristic across said front side surface of said substrate.

18. (New) The method in Claim 17, further comprising the steps of:

retaining said substrate within a cylindrical pocket defined by a retaining ring and sized to carry said substrate and to laterally restrain movement of said substrate when said substrate is moved relative to said processing tool during processing; and

defining an annular retaining ring pressure zone surrounding and substantially concentric with said first annular pneumatic pressure zone to press a contact surface of a retaining ring against said processing tool during processing.

19. (New) The method of Claim 18, wherein said annular retaining ring pressure zone is defined to be a pressure that alters a substrate material removal rate proximate a peripheral edge of said substrate to reduce under removal or over removal of material from a front side surface of said substrate relative to interior portions of said substrate.

20. (New) The method in Claim 17, wherein said substrate material removal comprises substantially uniform material removal across said front side surface of said substrate.

21. (New) The method in Claim 17, wherein said substrate comprises a semiconductor material.

22. (New) A semiconductor wafer made by the process in claim 17.

23. (New) In a substrate planarization machine of the type having a retaining ring for retaining the substrate to a substrate carrier during planarization against a polishing pad, the planarization machine characterized in that a diaphragm mounts said substrate and is supported from a floating retaining ring.

24. (New) The substrate planarization machine in claim 24, further characterized in that said substrate is a substrate selected from the set of substrates consisting of a glass material, a semiconductor material, a metallic material, and combinations thereof.

25. (New) In a substrate processing machine of the type having a floating retaining ring for retaining a substrate to a substrate carrier during processing against a material removal tool, the processing machine characterized in that an open diaphragm supported from said floating retaining ring presses said substrate against said material removal tool during said processing while said retaining ring retains said substrate.--